NEW GENERA AND SPECIES ON MELANOPLI FOUND WITHIN THE UNITED STATES AND CANADA (ORTHOPTERA; ACRIDIDAE)

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Part IV

Over a year ago, the third part of the present series of papers appeared.[1] Since that time our study of the North American Melanopli has made some progress, the manuscript having been prepared as far as the genus *Aeoloplus*. Press of work on exotic material has prohibited a more rapid advance, however, and for this reason we believe it best to describe, at the present time, the four additional new species and two geographic races which have been encountered.

Among these the distinctive *Bradynotes chilcotinae* is of particular interest. Added to the very large series of specimens available for study, the valuable information on this insect furnished by Mr. E. R. Buckell requires our very cordial thanks to that gentleman for such kind and thorough cooperation.

The discovery, by Dr. Witmer Stone, of another species of *Melanoplus* in the isolated Canadian Zone of the Chiricahua Mountains of Arizona, shows again the necessity for further careful work in such environment on all of the higher ranges of the Southwest.

A total of five hundred and seventy-three specimens are here recorded. In the present series of papers to date, a total of two genera, thirty-eight species and six geographic races have been described.

As is our custom, the location of all the material is indicated excepting that collected by Rehn and Hebard. This material is at present all in the Philadelphia Collections.

Agroecotettix modestus aristus new subspecies (Plate II, figs. 1, 2 and 3.)

Compared with the female type of *A. modestus modestus* Bruner, described from Lerdo, Durango, Mexico, females assigned to the present geographic race are distinguishable by their more robust form, with pronotum presenting a slightly more swollen appearance and less definition between the disk and lateral lobes, much broader tegmina, which are attingent, and caudal tibial coloration, these members being bright red distad.

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[1] Trans. Am. Ent. Soc., XLVI, pp. 355 to 403, (1920).

Males of the present race are similar to the females except as described below, the deeply forked cerci being distinctive. In general form they are more nearly comparable to males of *Phaulotettix compressus* (Scudder), than to those of the species of other North American genera of the Melanopli. From the latter they differ in the more flattened frontal costa, more inflated pronotum, with transverse sulci more decided and caudal margin feebly but distinctly convex, much broader and nearly attingent tegmina, small blunted and well separated furcula, much broader supra-anal plate, furcate cerci, prominent pallium, shallower and differently shaped subgenital plate and distinctive coloration.

Type.—♂; Uvalde, Uvalde County, Texas. Elevation, 1000 to 1100 feet. August 21, 1912. (Rehn and Hebard.) [Hebard Collection, Type no. 749.]

Size medium large; form robust, when compared with species of nearest affinity. Head large, eyes large and prominent, the greatest width across the eyes approximating the greatest pronotal breadth. Vertex much as in *Phaulotettix*, slightly produced and bluntly rounded, its dorsal surface moderately concave particularly between the eyes, where delicate convex lateral carinae are distinct and approximate. Frontal costa broad and flat, showing weak depression about the median ocellus, below that point gradually disappearing into the face.

Pronotum with dorsal and lateral portions of prozona smooth, but with a few impressed punctae laterad and somewhat inflated between the decided transverse sulci, which sever the medio-longitudinal carina, this carina distinct except between the transverse sulci, where it is very weak.[2] Pronotal lateral carinae, which are subobsolete through the lateral margins of the disk, are apparent on the prozona, due to the color pattern; metazona impresso-punctulate, the caudal margin of the disk weakly but distinctly convex. Tegmina very broad oval, extending slightly beyond caudal margin of metanotum, separated by a very slight interval. Minute, very elongate oval, vestigial wings present, concealed by the tegmina. Large, open tympana covered by the tegmina.

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[2] Apparently variable in this portion, as it is subobsolete to distinct in the large series before us of the Trans-Pecos Texan race (*A. m. crypsidomus*) of the species.

Distal portion of abdomen distinctly, though not decidedly, enlarged. Furcula represented by two broad and well separated, very brief convexities, which extend very slightly beyond the margin of the tergite. Supra-anal plate with length about equal to width, broadly rotundato-triangular, lateral portions broadly and weakly concave, with a minute node mesad; median portion weakly elevated and rather broadly and weakly concave. Cercus over four times as long as its proximal width, bifurcate at end of proximal three-fifths, proximal portion narrowest at its median point (where it is about one-third as broad as long) due to the concavity of the dorsal margin, ventral margin straight throughout, except that feeble convexity is indicated proximad; internal section of distal portion produced in a straight, flattened finger, subequal in width, about three times as long as broad, with greatest thickness vertical and apex rounded, this finger directed meso-caudad; external section of distal portion produced in a straight slender spike, with apex very narrowly rounded, longer than internal section and directed caudad, so that the axes of these portions form an angle of something less than ninety degrees.

Subgenital plate with depth about one-half length of the free margin, that margin weakly concave laterad and feebly angulato-convex mesad. Prosternal spine rather sharply conical, showing a weak flexure cephalad. Interspace between mesosternal lobes nearly twice as long as wide. Cephalic and median femora heavy, inflated and bowed. Caudal femora rather short and very robust, though proportionately not as short and robust as in *Phaulotettix compressus*. Caudal tibiae with eight to ten spines. Caudal tarsus distinctly less than half as long as caudal tibia.

Allotype.—♀; same data as type. [Hebard Collection.]

Agrees closely with male in coloration and relative proportions; differing in the following features. Size larger, form moderately stouter. Vertex proportionately slightly broader. Tegmina proportionately broader, attingent. Genitalia normal, the ovipositor valves stout, with denticulations of dorsal margin of dorsal pair blunt, heavy and irregular and with the stout apices acute and well curved. Interspace between mesosternal lobes about one and one-half times as long as broad.

Measurements (in millimeters)

♂	Length of body	Length of pro-notum	Width of pro-notum	Length of tegmen	Width of tegmen	Length of caudal femur
Uvalde, Texas, *type*	21.7	5.3	4.9	4	3	12.2
Uvalde, Texas, *paratypes*	21.7–23.3	5.6–5.8	5.1–5.2	3.8–4	3–3.2	12.8–13
Laredo, Texas	22.3	5.8	5.2	4	3.8	12.9
♀						
Uvalde, Texas, *allotype*	31.2	7.8	7	4.8	4.6	16
Uvalde, Texas, *paratypes*	30.3–30	7.3–7.3	6.7–6.8	5–4.3	4.2–4.2	15.8–15.3
Laredo, Texas	28	6.8	6	4.8	4.3	14.2

In the present series the width of the caudal femur is; ♂, 4 to 4.1; ♀, 4.8 to 5 mm. The tegmina slightly overlap in the Laredo male, in the others the interval between these organs is .25 to .35 mm.

Larger series are needed to determine whether the tegminal differences, which appear to aid in separating the races of this species, are constant in this race and *modestus modestus*.

General color ochraceous-buff (individually tinged with ochraceous-tawny, varying to yellow-ocher), with a conspicuous round spot of ochraceous-buff laterad near base of tegmina. Head marked with blackish as follows: medio-longitudinally on the dorsal surface in a band which is divided by a pale line caudad, with a postocular streak, flecks on the genae and with a transverse band on each side beneath the antennal sockets terminating at the margins of the frontal costa. Pronotum with medio-longitudinal band continued on prozona, there dividing and then converging and forming a very narrow oval, thence quickly becoming obsolete on the metazona; medio-longitudinal carina, sulci and prozonal portion of lateral lobes pictured with blackish, the sutures of the pleura and periphery of the pale spot also blackish. Tegmina with the multitude of minute veins ochraceous-tawny, the minute interstices mummy-brown. Abdomen with proximal tergites irregularly suffused with blackish meso-laterad. Ventral surface paler, usually tinged with yellow-ocher, sutures of abdominal sternites black, male subgenital plate with a median fleck of black. Cephalic and median limbs immaculate, of the general coloration. Caudal femora with two heavy transverse bands and a dorso-proximal suffusion of blackish, the first (median) band becoming oblique on the external pagina, ventral margin of external pagina with a few heavy black flecks, genicular areas black laterad except for entire area of genicular lobes which is yellow-ocher; internal face of caudal femora antimony yellow, tinged with coral-red ventro-proximad and crossed by the more distal of black bands. Caudal tibiae of general coloration proximad, with a blackish ring at end of swollen portion, and with flecks of blackish or suffused with that color at end of proximal third, remaining two-thirds bright coral-red, spines and spurs buffy tipped with black, except proximo-internal spines which are wholly black.

Specimens Examined: 8; 4 males and 4 females.

TEXAS: Uvalde, Uvalde County, 1000 to 1100 feet, VIII, 21, 1912, (R. and H.), 3 ♂, 3 ♀, *type, allotype, paratypes*. Laredo, Webb County, 550 feet, VIII, 12, 1912, (R. and H.), 1 ♂, 1 ♀.

Like *Rhabdotettix*, this species is thamnophilous and usually found in thorn bushes, but it is also frequently encountered in other vegetation affording security. The comparative scarcity of the present race, in the small portion of the United States in which it occurs, causes us to believe that, in adjacent northern Mexico, *modestus aristus* will be found to have a very much wider distribution, occurring there much more abundantly.

Agroecotettix modestus crypsidomus new subspecies[3] (Plate II, figs. 4, 5 and 6.)

1917. *Agroecotettix modestus* Hebard, Proc. Acad. Nat. Sci. Phila., 1917, p. 263. [♀; Monclova, Coahuila, Mexico.]

The present geographic race is separated from *A. modestus aristus*, here described, by the average smaller size and less swollen pronotum. Males are further separated by the shorter cerci, the forks of which are much shorter, with the external arm shorter than the internal arm. Females are less readily distingished by the proportionately smaller tegmina, which are separated by a moderate interspace.

Compared with the type of *A. modestus modestus* Bruner, a female, individuals of that sex of the present race are distinguished by their smaller size and red coloration of the distal portions of the caudal tibiae. The slightly more swollen pronotum and form and position of the tegmina show a development approximately intermediate between that of *m. modestus* and *m. aristus*.

The discovery of males of *m. modestus* will aid greatly in defining accurately the relative position of the races of the species.

Type.—♂: Marathon, Brewster County, Texas. Elevation, 3940 to 4160 feet. September 12, 1912. (Rehn and Hebard.) [Hebard Collection, Type no. 750.]

Agrees fully with *m. aristus*, described on page 50, except in the following characters. Size smaller, medium. Vertex distinctly narrower. Inflation of prozonal portion of pronotum less decided. Cercus about three times as long as its proximal width, proximal portion narrowest at its median point (where it is about one-third as broad as long), due to the concavity of the dorsal margin, ventral margin straight throughout, except that feeble convexity is indicated proximad; internal section of distal portion produced in a straight, flattened finger, subequal in width, about twice as long as broad, with internal surface moderately convex and external surface flattened and moderately oblique, apex rounded, this finger directed meso-caudad; external section of dorsal portion produced in a straight, rapidly tapering spike, with apex very narrowly rounded, very slightly shorter than internal section and directed caudad, so that the axes of these parts form an angle of something less than ninety degrees.

In the large series at hand the extremities of the male cerci show some variation in length and form. The external production is usually decidedly shorter than the internal production, rarely nearly as elongate.

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[3] From κρυψί-δομος = dwelling in secret places.

Allotype.—♀; same data as type. [Hebard Collection.]

The female sex of the present race differs from males as described for the female of *m. aristus* on page 51 except that the tegmina are more similar and are always moderately well separated.[4] Interval between the mesosternal lobes less than one and one-half times as broad as long.[5]

Measurements (in millimeters)

♂	Length of body	Length of pronotum	Width of pronotum	Length of tegmen	Width of tegmen	Length of caudal femur
Sanderson, Texas (6)	17–18.8	4.6-4.8	4.1–4.2	2.8–3.2	2.3–2.8	10.1–11.3
Marathon, Texas, *type*,	20	5	4.8	3.4	2.8	11.8
Marathon, Texas, *paratypes*, (42)	17.4–22.2	4.2-5	4.1–4.8	3–3.6	2.7–3	10.5–12
Persimmon Gap, Texas, (2)	16.4–17	3.8–4	3.7–3.9	2.6–3	2.3–2.4	9.8–10.4
Moss Well, Texas, (22)	18–20	4.1–5.1	4–4.9	3–3.6	2.6–2.9	10.4–12
♀						
Sanderson, Texas, (7)	19.3–25	5–6	4.8–5.4	3–4	2.7–3.3	11.3–13.8
Marathon, Texas, *allotype*,	26.3	6.2	5.9	4	3.3	14
Marathon, Texas, *paratypes*, (42)	22.2–27.2	5–6.7	5–6.3	3.2–4.3	2.8–3.3	12.3–14.2
Pine Mountain, Tex.,	28	6	6	4.2	3.4	14
Persimmon Gap, Texas, (4)	19.2–24.2	4.8–5.6	4.5–5.2	3–3.8	2.8–3.1	11.5–13.7
Moss Well, Tex., (19)	22.3–28.6	5.1–5.9	5–5.9	3.9–4.2	2.8–3.3	12.1–13.8

For convenience in comparing the measurements, we give the following for the type of *modestus modestus* Bruner, a female from Lerdo, Durango, Mexico. Length of body, 31.1; length of pronotum, 6.9; width of pronotum, 6.5; length of tegmen, 4.9; width of tegmen, 3.7; width between tegmina, 2.3; length of caudal femur, 15.8; width of caudal femur, 4.8 mm.

The extremes of caudal femoral width are; ♂, 3 to 3.8; ♀, 3.1 to 4.4 mm. The variation in width of the interval between the tegmina is; ♂, .1 to .8; ♀, .8 to 1.7 mm.

In general coloration the present race agrees closely with *modestus aristus*. except that the majority of specimens have the general coloration darker, sayal brown, sometimes as deep as suffused bister. In consequence, the markings are less striking and the general appearance not as brilliant. The dark markings of the pronotal disk show decidedly less curvature, in the great majority of specimens being subparallel and in a few of maximum intensive coloration fusing, so that in this region there is a dark medio-longitudinal band. In the darker specimens, the dark bars of the caudal femora are much less conspicuous and indeed are obsolete in a few of these.

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[4] Varying in the large series at hand from .8 to 1.7 mm.

[5] Varying in the series to very slightly broader than long, thus showing anew that this space is individually decidedly variable in the Melanopli, and can certainly not be used as of high generic or specific significance as was supposed by Scudder.

The markings of the pronotal disk and darker general coloration show closer agreement with the type of *modestus modestus*. The present material, like that of *modestus aristus*, however, differs from that race in the red of the distal portions of the caudal tibiae and the ventro-proximal portion of the internal faces of the caudal femora.

Specimens Examined: 192; 88 males, 102 females and 2 immature individuals.

Texas: Sanderson, Terrell County, 2800 to 3150 feet, VIII, 25, 1912, (R. and H.), 6 ♂, 7 ♀. Marathon, Brewster County, 3900 to 4160 feet, VIII, 26 to IX, 13, 1912, (R. and H.), 43 ♂, 43 ♀, *type, allotype, paratypes*. Garden Spring, Brewster County, IX, 2, 1912, (R. and H.), 1 ♂ 3 ♀, 2 juv. Persimmon Gap, Brewster County, 3000 feet, IX, 10, 1912, (R. and H.), 2 ♂, 4 ♀. Avery Canyon, Grapevine Hills, Brewster County, 3000 feet, IX, 4, 1912, (R. and H.), 1 ♂. 1 ♀. Neville Spring, Brewster County, 3250 to 3300 feet, IX, 8, 1912, (R. and H.) ,1 ♂, 2 ♀. Moss Well, Chisos Mountains, 4500 to 5000 feet, IX, 5 to 8, 1912, (R. and H.), 22 ♂, 19 ♀. Lost Mine Peak, Chisos Mountains, 6000 feet, IX, 6, 1912, (R. and H.), 1 ♂, 1 ♀. Canyon behind Pulliam Bluff, Chisos Mountains, 5000 feet, IX, 7, 1912, (R. and H.), 9 ♂, 17 ♀. Pine Mountain, Davis Mountains, 6250 feet, VIII, 29, 1912, (R. and H.), 1 ♀. Maguires Ranch, upper Limipa Canyon, Davis Mountains, 5600 feet, VIII, 29, 1912, (R. and H.), 1 ♀. Quitman Mountains, El Paso County, 4800 to 5400 feet, IX, 14, 1912, (Hebard), 2 ♂, 2 ♀.

Mexico: Monclova, Coahuila, IX, 20, (E. Palmer), 1 ♀, [Mus. Comp. Zool.].

Not only was this insect often found abundant in the catclaw and other thorny shrubs, in the semi-desert areas of Trans-Pecos Texas, but it was also seen frequently to seek shelter in the sotols (*Dasylirion* sp.). It was found at elevations from 2800 to 6250 feet, but was never met with in any numbers above the 5000 foot level in either the Chisos or Davis Mountains.

Conalcaea coyoterae[6] new species (Plate III, figs. 1, 2 and 3.)

This insect is related to *C. huachucana* Rehn. It agrees closely in all features except that in most of the specimens before us the caudal femora are not conspicuously bicolored[7], the

[6] The Coyotero Apaches, "Wolf-Men", inhabited the region from which the present species is known.

[7] In a single male, from Bill Williams Mountain, the coloration of the caudal femora is exactly as in *huachucana*. It would appear that no feature of coloration is of sufficient constancy, over the range of these species, to warrant its use as an unqualified diagnostic criterion.

male cerci are shorter with distal portion proportionately much broader and distal margin rounding strongly to the less produced ventro-caudal angle, while the male subgenital plate is shorter and not as sharply conical (for *huachucana* see plate III, figures 4 and 5).

In the coloration of the caudal femora, *coyoterae* agrees more closely with *C. miguelitana* (Scudder), in all other respects being, however, the opposite extreme of the forms of this stock, *huachucana* occupying an intermediate position in the form of the male cerci.

Type.—♂; Prescott, Arizona. Elevation, 5400 feet. July 21, 1917. (J. A. Kusche.) [Hebard Collection, Type no. 751.]

Size rather large compared with species of allied genera; form robust, subfusiform. Head as in *huachucana*[8], small in proportion to the body bulk, distinctly narrower than greatest pronotal width, scutellum of the fastigium weakly concave between the very delicate but distinct lateral carinae, frontal costa weakly concave toward the median ocellus, eye distinctly over one and one-half times as long as infra-ocular sulcus. Pronotum, tegmina and abdomen as in *huachucana*. Furcula represented by thickenings of the tergite, causing weak and well separated angulations of the margin. Supra-anal plate triangular with apex blunted, nearly as long as wide, median sulcus broad and percurrent, deepest in proximal half, lateral portions weakly and broadly concave, with a minute conical projection near the lateral margins at two-fifths the distance to the apex.[9]

Cercus narrowing in proximal third, thence widening greatly, due to expansion dorsad, the ventral margin being broadly and evenly convex throughout, the dorsal portion of the expanded section (which is nearly twice as wide as the proximal width and nearly half as wide as the cercal length) convex to the acute-angulate, briefly produced ventro-caudal angle (the apex). Subgenital plate conical, its apex blunt, shorter and blunter than in *huachucana*. Cephalic and median femora somewhat inflated and weakly bowed.

Allotype.—♀; Prescott, Arizona. Elevation, 5400 feet. July 31, 1917. (O. C. Poling.) [Hebard Collection.]

Very similar to females of *huachucana*, except that the caudal femora are not contrastingly colored, the external pagina of the general brown coloration, feebly and not solidly suffused with a darker shade.

Differs from the male in the following features. Size decidedly larger, form much more robust. Eye less than one and one-half times as long as infra-ocular sulcus. Even widening of the pronotal disk as regular but decidedly stronger. Ovipositor valves with stout apices moderately elongate and weakly curved, blunt teeth of dorso-external margin of dorsal valves large and irregular. Cephalic and median femora not inflated; the former nearly straight, the latter straight.

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[8] Rehn's excellent description is best referred to; Proc. Acad. Nat. Sci. Phila., 1907, p. 48, (1907).

[9] Also found in *huachucana*.

Measurements (in millimeters) of extremes

♂	Length of body	Length of pro-notum	Width of pro-notum	Length of tegmen	Width of tegmen	Length of caudal femur
Prescott, Arizona, *type*,	18.5	4.2	4.2	4	1.9	11.2
Prescott, Arizona, *paratypes*, (18)	17-19.2	4.2-4.4	3.9–4.2	3.2–3.8	1.9–1.7	11-11.1
Mount Union, Prescott, Arizona	20	4.9	5	3.9	2	12.8
Bill Williams Mountain, Arizona	21	5	5	4.2	1.9	13
♀						
Prescott Arizona, *allotype*,	26	5.9	6.3	5.5	2.3	14.8
Prescott, Arizona, *paratypes*, (42)	21–30	5.1–6.3	5.4–7.2	4.7–5.4	1.9–2.5	12.7-15.7
Mount Union, Prescott, Arizona, (3)	24.7–29.4	6.3–6.1	6.7–6.8	4.8–4.6	2.1–2.1	15-15.4

The width of the caudal femur in the series is: ♂, 3 to 3. 4; ♀, 3. 4. 4–4. 1 mm.

Coloration very similar in the series, except that in the males the average is slightly more contrasting and brilliant. Occiput, disk of pronotum and dorsal surface of mesonotum and metanotum dull sayal brown (individually varying from cinnamon to warm sepia in the specimens of maximum recessive and intensive coloration). Cephalic and median limbs of this coloration, showing vague irregularities of shade. Dorsal surface of male abdomen, in proximal half shining blackish brown laterad, with a narrow medio-longitudinal band of pinkish cinnamon, remaining portions sayal brown; in females much more uniform, less shining, with latero-proximal portions only slightly darkened and medio-longitudinal band very weakly defined, in some individuals unicolorous. Remaining portions of head, lateral lobes of pronotum and underparts clay color, except for a weakly defined postocular bar on each side of the head (heavy in occasional specimens), which is continued on the dorsal portion of the pronotal lateral lobes as a broad, solidly colored, shining black band, in females often weak cephalad and caudad. On the sides, the meta-episternum and the meta-epimerum are shining black. Tegmina cinnamon-buff to clay-color in dorsal half, blackish brown to black and usually shining in ventral half. Caudal femora of the general coloration dorsad, paling to the ventral coloration ventrad, the external pagina vaguely and not solidly suffused with a darker shade, which in some females shows a faintly greenish tinge. Caudal tibiae varying from grenadine to peach red.

This type of caudal femoral coloration is strikingly different from the normal for *huachucana*, but a single male is before us agreeing fully in this respect with that species. In that individual the external pagina is strikingly bicolored, the dorsal portion almost black, the ventral portion ochraceous-buff.

We would note that the usual difference from *huachucana* in the caudal femoral coloration is also shown in the immature stages, when dark markings are there present. In some of the juveniles the caudal femora are immaculate, the majority having, however, the entire external pagina black, except for invasions of the light general coloration. These invasions, when decided, break the black area into characteristic Melanoploid bands, which are continued across the dorsal surface of the femora.

Like the other species of this genus, the present is probably strictly geophilous, agreeing with *huachucana* in being an inhabitant of the Encinal, or Region of Oaks, in Arizona. The entire series was taken at elevations of from 5400 to 6500 feet.

Specimens Examined: 115; 20 males, 76 females and 19 immature individuals.

Arizona: Bill Williams Mountain, IX, 14, 1917, (O. C. Poling), 1 ♂, [Hebard Cln.]. Prescott, VII, 5 to VIII, 24, 1917, (Poling; Kusche), 19 ♂, 68 ♂, 19 juv., *type, allotype, paratypes*, [Hebard Cln.]. Granite Peak, Prescott, VIII, 17, 1917, (J. A. Kusche), 4 ♀, [Hebard Cln.]. Mount Union, Prescott, VIII, 15, 1917, (J. A. Kusche), 1 ♂, 3 ♀, [Hebard Cln.]. Senator, Yavapai County, VIII, 12, 1917, (J. A. Kusche), 1 ♀, [Hebard Cln.].

Bradynotes chilcotinae new species (Plate III, figs. 6, 7 and 8.)

This species is readily separable from any of the previously known forms by the large triangular furcula of the male and other genitalic features in this sex.

In form it agrees best with *B. caurus* Scudder, the definition between the disk and lateral lobes of the pronotum being weakest in these species. In coloration it is dark, showing the greatest reduction of the brilliant colors found on the caudal limbs in the majority of the species of *Bradynotes*.

The caudal tibiae are buffy, as in *B. albida* Hebard, *B. excelsa* Rehn and *B. satur* Scudder, but these members are often strongly suffused in the present insect.

The male cerci often fail to reach as far distad as the apex of the supra-anal plate and are as slender at their apices as in *B. compacta* Morse[10]. The male supra-anal plate, though subject to considerable variation, is seen to be never of the simple, longer type developed in *B. obesa* (Thomas) and its closer allies, in which the lateral margins are weakly concave convergent to the broadly rounded apex.

Type.—♂; Riske Creek, Chilcotin, British Columbia. July 22, 1921. (E. R. Buckell.) [Canadian National Collection.]

Size medium large for the genus; form heavy, though not as heavy as in *obesa* and its closer allies; surface moderately pilose. Head broad and full, vertex gently tumid; fastigium shallowly concave, the lateral margins thick, rounded and very weakly defined, the width at the ocelli decidedly greater than between the eyes; frontal costa comparatively broad and shallowly concave, with lateral margins rounded and very weakly defined, surface rather decidedly impresso-punctate; least width distinctly greater than that of proximal antennal joint, greatest width between antennal bases. Eyes slightly longer than infra-ocular sulcus.

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[10] Compare, Trans. Amer. Ent. Soc., xlv, pl. xxix, fig. 11, (1919).

Pronotum much as in *caurus*, the weakly convex disk curving into the lobes, with the low and broadly rounded lateral carinae subobsolete; disk expanding very slightly caudad, medio-longitudinal carina obsolete, except very briefly cephalad on prozona and on metazona caudad of the principal sulcus, continued on abdomen but very weak and obsolete on proximal tergites. Tegmina and wings absent.

Furcula represented by a pair of large, triangular projections, which form mesad an obtuse-angulate emargination and have their external margins straight, longitudinal; these processes are broader than long, but in length from base of their tergite exceed one-fourth the length of the supra-anal plate.[11] Supra-anal plate broad, its length equal to (varying in the series to slightly greater than) its basal width; lateral margins weakly convergent and very weakly convex to distal portion, where on each side a very strongly obtuse-angulate emargination is indicated; (in the series at hand the apex of the plate varies from sharply triangular to very strongly rounded-triangular, the emargination laterad varying from obsolete to strongly defined,) surface deeply concave laterad, with a broad medio-longitudinal concavity, which is strong proximad, very weak mesad and shallow distad.[12]

Cerci shorter than (varying in the series to as long as) the supra-anal plate, tapering gradually from the broad base to the very slender, rounded apex. Subgenital plate full, conical, free lateral margins weakly convex to the very blunt apex, which is entire and is produced caudad but not elevated. Cephalic and median femora moderately inflated, very feebly bowed.

Allotype.—♀; same data as type, but taken June 24, 1921. [Canadian National Collection.]

Larger and more robust than male. Fastigium of vertex and frontal costa much broader and with surface much more weakly concave, the surface of the latter impresso-punctulate. Eye in length approximately that of infra-ocular sulcus. Pronotum moderately broadened caudad, its convexity very weakly interrupted by the subobsolete lateral carinae, which scarcely delimit the disk from the lateral lobes; medio-longitudinal carina subobsolete, obsolete on the three succeeding segments, but again weakly indicated on the abdominal tergites. Ovipositor valves much as in *satur*, the dorsal pair showing weaker curvature than in *obesa*. Cephalic and median femora neither inflated or bowed.

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[11] Though somewhat variable in length and width, these projections are seen to be constant in general contour in the very large series under consideration.

[12] In no specimens could the type of this plate be confused with that of *obesa* and its closer allies.

Measurements (in millimeters) of extremes

	Length of body	Length of pronotum	Width of pronotal disk cephalad	Width of pronotal disk at principal sulcus	Length of caudal femur
♂					
Type	21.4	4.2	2.8	3.4	11.7
Paratypes, (85)[13]	21–25	4–5	....	....	11–12.5
Big Bar, British Columbia, (4)	17–18.5	3.7–3.8	2.5–2.6	3.2–3.3	10.3–10.4
♀					
Allotype	24	4.8	3.8	4.8	13.4
Paratypes, (78)[13]	24–40	4.8–6	....	....	12.5–15
Big Bar, British Columbia,(2)	21.5–22.2	4.2-4.3	3.3–3.3	4.1–4.2	12.3-12.2

The size reduction shown by the Big Bar specimens is probably attributable to different local environmental conditions.

General coloration of dorsal surface of males chestnut-brown, deepening to shining blackish brown proximad on sides of abdomen, except ventrad toward margins of tergites, where narrow invasions of the buffy color of the ventral surface occur. Ventral surface light ochraceous-salmon, or antimony-yellow with a salmon tinge. Frontal costa, face, genae and ventro-lateral portions of pronotum and thorax buffy, darkened by very numerous dots and flecks of dark brown. Cephalic and median limbs similar, but not as much darkened. Pronotal lateral lobes with dorsal portion slightly darker and more shining than disk, this weakly defined band continued on the sides of the thorax.

Caudal femora buffy, with minute flecks and dots of dark brown, dorsal and external faces with two broad bands of chestnut-brown, which are oblique on the external pagina, the genicular areas also darkened. In many specimens these portions are often greatly suffused, in some so dark that the bands have become almost obsolete. Internal surface of caudal femora proximad and ventro-internal surface distad vinaceous rufous or dragons blood red. Caudal tibiae buffy, frequently strongly washed with mummy brown; spines and spurs buff proximad, black distad.

The females vary in general coloration from chestnut-brown to prout's brown and are much more uniform, the darker bands of the body and caudal femora being subobsolete or absent. In this sex the ventral surface of the doby appears to be light brown, but is seen to be usually much discolored and darkened in dried specimens.

Mr. Buckell writes that this insect is "extremely common in semi-sylvan locations, especially in upland pastures beneath the aspens (*Populus tremuloides*). In some places it is the commonest grasshopper to be found." The species was found hatching as early as May 1st, while adults were numerous and freely pairing by July 20th. In early August it had become scarce, but about the middle of September many adults were again found, pairing freely, and the species was still common in October

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[13] These measurements were taken by Mr. Buckell, from the material before drying.

These interesting notes by the energetic discoverer of this new species indicate that, in the Chilcotin, it is probably double brooded.

We are told that individuals are much sought after by the Indians for fish bait.

Specimens Examined: 245; 137 males and 108 females.

British Columbia: Riske Creek, Chilcotin, VI, 20, 1920, 3 ♂, 3 ♀; IX, 18, 1920, 1 ♂, 1 ♀; IV, 18, 1921, 38 ♂, 27 ♀; V, 30 to VIII, 1, 1921, 91 ♂, 75 ♀, *type*, *allotype* and all others *paratypes*, (all taken by E. R. Buckell).[14] Big Bar, 7400 feet, VII, 9, 1921, (E. R. Buckell), 4 ♂, 2 ♀.

Melanoplus chiricahuae new species (Plate III, figs. 9 and 10.)

This handsome insect agrees closely in size, coloration and general appearance with *M. femur-nigrum* Scudder, a species known from the northern portion of the Arizona Plateau.

In male cercal development nearest approach is found in *M. calidus* Scudder, which species occurs in the White and Sacramento Mountains of south-central New Mexico. The cerci of that species are, however, much broader and shorter, with broadened apical portion more conspicuously truncate. In other features wide differentiation between these two species occurs, *chiricahuae* being clearly much more closely related to *femur-nigrum*.

Type.—♂; Ida's Peak, Chiricahua Mountains, Cochise County, Arizona. Elevation, 8000 feet. June 28, 1919. (Witmer Stone.) [Acad. Nat. Sci. Phila., Type no. 5381.]

Size and form medium for the group. Vertex and frontal costa as in *femur-nigrum*. Eye large, nearly twice as long as infra-ocular sulcus. Pronotum as in *femur-nigrum*: medio-longitudinal carina weak on prozona, very weak between transverse sulci, moderately decided on remaining portion of metazona, sulci distinct but not deep; lateral margins of pronotal disk subparallel to principal sulcus, caudal margin of same broadly obtuse-angulate produced with apex rounded. Prosternal spine longer than broad, slightly transverse, cylindrical to distal portion which tapers off strongly to the rounded apex. Tegmina very slightly longer than pronotum, almost attingent, oval, with apex rounded, though not broadly so.

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[14] The bulk of this series is in the Canadian National and Philadelphia Collections. Sets, however, will be sent to the other larger North American collections of Orthoptera.

Furcula represented by two minute projections, with bases weaky convex to base of their tergite, the projecting portions slightly longer than wide. Supra-anal plate shield-shaped, with lateral margins proximad straight and parallel for a short distance, then moderately raised, very weakly concave and convergent to the short, thick, weakly elevated disto-lateral carinae, the small apical portion triangular with apex bluntly rounded. Surface of supra-anal plate broadly concave laterad, with a broad medio-longitudinal sulcus in proximal half, which is very weak (absent in paratype) in distal half.

Cerci nearly two and one-half times as long as basal width, straight, narrowing gradually, then expanding, so that the distal third is slightly enlarged with dorsal margin slightly more convex than ventral margin, apical portion with external surface weakly concave, broadly rounded dorso-distad, but forming a moderately (sharply, in paratype) rounded rectangulate disto-ventral angle, the distal margin transverse. Subgenital plate produced meso-dorsad in a large, bluntly rounded tubercle, directed caudad, which tubercle is slightly more produced and less heavy than in *femur-nigrum*.

Allotype.—♀; same data as type. [Acad. Nat. Sci. Phila.]

Agrees with type except as follows. Size larger, form more robust. Sulcation of vertex and frontal costa weaker and broader. Eye about one and two-thirds times as long as infra-ocular sulcus. Pronotum with lateral margins of disk weakly divergent to principal sulcus. Prosternal spine heavier toward its base. Ovipositor valves moderately elongate, with distal curvature rather broad; the dorsal valves with dorsal surface and margins proximad rather well supplied with serrations.

Measurements (in millimeters)

♂	Length of body	Length of pro-notum	Caudal width of pro-notal disk	Length of tegmen	Width of tegmen	Length of caudal femur
Type	20.2	4.7	2.8	5	2.8	10.8
Paratype	19[15]	4.6	2.7	4.9	2.6	10.7
♀						
Allotype	24	5.3	3.9	5.9	3.4	12.7

Dorsal surface of male blackish chestnut-brown; the lateral margins of the pronotal disk outlined in buffy to the principal sulcus in the paratype (a frequent color feature in species of this group). Other portions of head, ventral portions of pronotal lateral lobes, cephalic and median limbs and underparts clay color, often with an olivaceous tinge; the head with a broad shining postocular black bar, which broadens and is continued on the lateral lobes of the principal sulcus. Lateral portions of thorax blackish, with a striking, oblique bar of light buff. Sides of abdomen heavily overlaid with shining black, this narrowing strongly caudad.

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[15] Estimated, the abdomen being curved upward in this specimen.

Dorsal surface of caudal femora hazel, with all of genicular areas, two bars and a proximal fleck of chestnut-brown, the first bar extending a brief distance on the internal surface, the second bar crossing the internal surface, which is elsewhere buff-yellow, becoming paler before the genicular area. External surface of caudal femora colored as is characteristic of the group; chestnut-brown, with the rather narrow ventral portion buff-yellow; ventral surface faintly tinged with orange. Caudal tibiae rich glaucous-blue, spines black, spurs white proximad and black distad.

The female is very similarly colored, the dorsal surface being paler, chestnut-brown.

In addition to the type and allotype, a single paratypic male, bearing the same data, has been examined.

Melanoplus fultoni[6] new species (Plate III, figs. 11 and 12.)

This diminutive species is a member of the Marginatus Group, belonging to that section which includes the forms very closely allied to *M. gracilipes* Scudder.

It is nearest *M. sonomaensis* Caudell, differing in the male sex in the proportionately longer and more slender furcula, supra-anal plate with transverse median carina (subobsolete in *sonomaensis*) raised in a small but prominent rounded lamella on each side of the medio-longitudinal sulcus, and subgenital plate which rounds evenly to the blunt apex (where, in *sonomaensis*, there is a small but conspicuous subapical tubercle).

In the female sex these species are almost inseparable. The females of *fultoni* before us differ from those of *sonomaensis* only in being slightly more robust, with fastigium of vertex a trifle less protuberant. The females of the other closely related species of this group are likewise almost indistinguishable. The difficulty in the present case is aggravated by the fact that we have *sonomaensis*, not only from north and south of Lagunitas, California, but from that locality as well.

Type.—♂; Lagunitas, Marin County, California. August 7, 1921. (B. B. Fulton.) [Hebard Collection, Type no. 832.]

Size small, form slender; agreeing closely with *sonomaensis*. Head much as in that species. Eye distinctly more than twice as long as infra-ocular sulcus. Pronotum as in *sonomaensis* and other closely related species; elongate, disk of almost equal width throughout, median carina well defined and percurrent; caudal margin broadly obtuse-angulate produced. Prosternal spine conical with apex moderately blunt (varying from blunt to a condition in which the

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[16] Named in honor of the collector of this insect, Mr. B. B. Fulton, whose masterly "Tree Crickets of New York" is one of the finest of recent entomological contributions.

spine is more slender with apex much more sharply rounded in the paratypes). Tegmina considerably shorter than pronotum, almost attingent, with apex broadly rounded.

Furcula represented by a pair of minute, slender processes, three times as long as broad, which do not taper to their rounded apices (varying to more slender and weakly tapering in the paratypes), are faintly divergent (varying to moderately divergent in the paratypes), with length contained in that of supra-anal plate nearly four times (varying to three and one-half times in the paratypes). Supra-anal plate moderately elongate, shield-shaped; median sulcus decided, with lateral margins distinctly carinate to slightly beyond median point; transverse carina there, toward the lateral margins of this sulcus, developed into a small but conspicuous lamella on each side, with margin rounded; lateral portions of plate rather strongly concave, disto-lateral carinae subobsolete.

Cerci faintly bent slightly beyond end of proximal two-thirds, approximately twice as long as basal width, tapering strongly proximad; dorsal margin broadly concave, ventral margin straight, becoming weakly convex distad; distal portion very slender to the rather sharply rounded apex, the external surface showing faint subapical concavity. Subgenital plate with median section of equal depth laterad and mesad, curving and tapering meso-distad to the blunt apex, which shows no trace of tuberculation. Limbs as in *sonomaensis*.

Allotype.—♀; same data as type. [Hebard Collection.]

Size larger, form heavier, fastigium of vertex broader and less deeply sulcate than in male. Compared with females of *sonomaensis* above.

Measurements (in millimeters)

♂	Length of body	Length of pro-notum	Caudal width pro-notum	Length of tegmen	Width of tegmen	Length of caudal femur
Type	13	3.3	1.9	2.7	1.9	8
Paratypes, (6)	13–14.7	3.3-3.4	1.9–2	2.1–3.2	1.3–2.2	7.9–8.5
♀						
Allotype	18.8	4	3.1	4	2.7	10.1
Paratypes, (2) . . .	17.7–18	4–3.9	3–2.9	3.6–4	2.7–2.7	10–10.1

Head tawny-olive, except occiput which is verona brown and a broad, shining, sharply defined, postocular bar of blackish brown. Eyes cinnamon-brown tinged with tawny. Antennae tawny-olive proximad, russet in other portions. Pronotum with disk verona brown, lateral lobes with a band of shining blackish brown occupying dorsal two-fifths of prozonal portion, corresponding metazonal portion verona brown deepening to warm sepia in dorsal portion, lower portion of lateral lobes tawny-olive. Tegmina verona brown, somewhat darker ventrad. Abdomen cinnamon dorsad, cinnamon-buff ventrad, with a broad band of shining blackish brown on each side, which narrows and decreases into small flecks on the distal tergites. Other portions of ventral surface clay color. Cephalic and median limbs clay color, tinged with cinnamon. Caudal femora similar, but showing faintly the characteristic Melanoploid pattern in a slightly darker brown, ventral surface orange-cinnamon. Caudal tibiae weak grayish glaucous; external spines black, internal spines and all spurs whitish proximad, black distad.

In the intensive examples the markings of the caudal femora are more distinct, the ventral surfaces brick red. In one female the caudal tibiae are grayish, showing no trace of glaucous. Another female is pale greenish yellow, showing no darker markings.

In addition to the described pair, a paratypic series of six males and two females is before us, belonging to the Fulton and Hebard Collections.

EXPLANATION OF PLATES

Plate II

Fig. 1.—*Agroecotettix modestus aristus* new subspecies. Uvalde, Texas. Male (*type*). Lateral view. (×2½)

Fig. 2.—*Agroecotettix modestus aristus* new subspecies. Uvalde, Texas. Male (*type*). Lateral view of cercus. (Greatly enlarged.)

Fig. 3.—*Agroecotettix modestus aristus* new subspecies. Uvalde, Texas. Female (*allotype*). Lateral view. (×2⅗)

Fig. 4.—*Agroecotettix modestus crypsidomus* new subspecies. Marathon, Texas. Male (*type*). Lateral view. (×2½)

Fig. 5.—*Agroecotettix modestus crypsidomus* new subspecies. Marathon, Texas. Male (*type*). Lateral view of cercus.[17] (Same scale as fig. 2.)

Fig. 6.—*Agroecotettix modestus crypsidomus* new subspecies. Marathon, Texas. Female, (*allotype*). Lateral view. (×2⅗)

Plate III

Fig. 1.—*Conalcaea coyoterae* new species. Prescott, Arizona. Male (*type*). Lateral view of cercus. (Greatly enlarged.)

Fig. 2.—*Conalcaea coyoterae* new species. Prescott, Arizona. Female (*allotype*). Lateral view of caudal femur. (×2¼)

Fig. 3.—*Conalcaea coyoterae* new species. Prescott, Arizona. Female (*allotype*). Lateral view of dorsal ovipositor valve. (Greatly enlarged.)

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[17] Due to the fact that the internal section of the distal portion of the cercus is of necessity foreshortened in this aspect, it appears as long as the external section, but is in reality very slightly shorter.

Fig. 4.—*Conalcaea huachucana* Rehn. Carr Canyon, Huachuca Mountains, Arizona. Male (*type*). Lateral view of cercus. (Same scale as fig. 1.)

Fig. 5.—*Conalcaea huachucana* Rehn. Carr Canyon, Huachuca Mountains, Arizona. Female (*allotype*). Lateral view of caudal femur. (×2¼)

Fig. 6.—*Bradynotes chilcotinae* new species. Riske Creek, Chilcotin, British Columbia. Male (*type*). Dorsal view of furcula and supra-anal plate. (Greatly enlarged.)

Fig. 7.—*Bradynotes chilcotinae* new species. Riske Creek, Chilcotin, British Columbia. Male (*paratype*). Dorsal view of distal portion of supra-anal plate, showing variation in the species. (Same scale as fig. 6.)

Fig. 8.—*Bradynotes chilcotinae* new species. Riske Creek, Chilcotin, British Columbia. Male (*type*). Lateral view of cercus. (Greatly enlarged.)

Fig. 9.—*Melanoplus chiricahuae* new species. Ida's Peak, Chiricahua Mountains, Arizona. Male (*type*). Dorsal view of furcula and supra-anal plate. (Scale same as fig. 6.)

Fig. 10.—*Melanoplus chiricahuae* new species. Ida's Peak, Chiricahua Mountains, Arizona. Male (*type*). Lateral view of cercus. (Scale same as fig. 8.)

Fig. 11.—*Melanoplus fultoni* new species. Lagunitas, California. Male (*type*). Dorsal view of furcula and supra-anal plate. (Same scale as fig. 6.)

Fig. 12.—*Melanoplus fultoni* new species. Lagunitas, California. Male (*type*.) Lateral view of cercus. (Same scale as fig. 8.)